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Belén de la Paz Cumsille Rojas

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**THE CHILEAN PENSION SYSTEM: GENDER INEQUALITIES IN
CONTRIBUTION DENSITIES**

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CONTRIBUTION DENSITIES**

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Dedication

To my parents Anita and Toño for always supporting me in pursuing my dreams and making no gender differences in our home. To my beloved siblings Salva and Flopa for always taking a smile out of me. To Rodolfo, who made me come here and opened my world.

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Abstract

The Chilean Pension System: Gender Inequalities in Contribution Densities

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In 1981, Chile established a defined contribution pension system, replacing the traditional pay-as-you-go system with defined benefits. The new model based on individual capitalization accounts, has generated different patterns of contributions to the individual accounts, mostly associated to labor market trajectories or unemployment. This report focuses on gender disparities in the Chilean pension system by analyzing the determinants of contribution densities for women and men. It explores how labor market trajectories, indicators of employment stability, and socioeconomic characteristics of the household of origin, affect contribution densities in the pension system. The main results confirm the existence of indirect gender inequalities that originate in the labor market and are then transmitted to the pension system. Furthermore, the results clearly support the existence of traditional gender roles with respect to work and family, which ultimately also have an effect on the pension system, through labor market trajectories. Finally, the report finds that mothers' education has an effect on the next generation's contribution densities, the relationship being a transmission of advantages.

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I. INTRODUCTION

In 1981, the Chilean pension system was transformed from a pay-as-you-go to a defined contribution system, based on individual capitalization accounts. The traditional scheme was replaced for a personal account in which workers are mandated to contribute a proportion of their wages that will fund their retirement pension in the future. All the payroll workers who entered the labor force after the reform were required to enroll in the new system, and workers who were in the old scheme could opt to remain in the pay-as-you-go-system (INP), or transfer to the new system (Joubert & Todd, 2011).

The new system is based on three pillars: the individual capitalization accounts, the voluntary savings, and the solidarity pillar. The individual capitalization pillar requires salaried workers to contribute 10% of their monthly salary to their individual accounts, which are withheld from their paycheck. In 2008, the reform to the pension system also required that self-employed workers to contribute to the mandatory individual account. These accounts are managed by for-profit private firms called *Administradoras de Fondos de Pensiones* (AFP), which invest the funds in the financial market. The voluntary pillar offers the possibility of saving voluntarily above the mandatory 10%, receiving tax benefits, in what is known as Voluntary Pension Savings (APV, for its name in Spanish *Ahorro Previsional Voluntario*). Finally, the state-run solidarity pillar guarantees a minimum pension amount to vulnerable populations.

The new model that primarily relies on individual capitalization accounts, has generated different patterns of contributions to the individual accounts, mostly associated to labor market trajectories or unemployment. Even when some authors have found positive macroeconomic consequences of the individual capitalization account system

(Roldos, 2007), the defined contribution scheme generates heterogeneous results at the individual level, raising equity concerns. Self-employed, informal workers, and women are the most vulnerable groups to face old age, given the irregularity of their contributions to their individual accounts throughout their active working life.

The heterogeneity in contribution patterns poses a challenge to the system because future pensions depend greatly on the number, the amount and timing of the contributions. Having a lower contribution density indicates lower savings in the individual account, leading to low pension payments in the future, which increases the financial burden of the state through the solidarity pillar.

This report focuses on one of the most vulnerable groups in the defined contribution system: women. The report seeks to identify potential gender inequalities produced by the Chilean pension system, particularly in the mandatory individual capitalization account pillar. The report explores the relationship of gender and contribution densities, different labor market trajectories, and gendered social norms towards work and family. Also, and more exploratory in nature, the report addresses the intergenerational transmission of social disadvantage by examining the relationship between socioeconomic characteristics of the household of origin and contribution densities. The next chapter provides a brief overview of the Chilean pension system. Chapter III reviews the sources of gender disparities in the system and states the research questions of the report. Chapter IV describes the data and presents descriptive statistics by gender. Chapter V has the main results of the analysis. The final chapter presents some concluding remarks.

II. GENERAL OVERVIEW

Since its inception in 1981, the Chilean pension system was devised as private pension system in which every salaried worker is mandated to contribute a percentage of their wage to fund their future passive life. AFPs, private for-profit institutions, are in charge of managing these individual accounts and investing the funds in the financial market. The logic of the AFP system as it was originally devised is summarized in Table 1 below.

Table 1: Pension System Logic

	Management		Logic		Benefits	
	State	Private	Pay-as-you-go	Capitalization	Defined	Uncertain
Chile before 1981	X		X		X	
Chile after 1981		X		X		X
United States	X	X	X	X	X	

Source: Bernstein, Larraín, Pino, & Morón (2006), adapted

Before the 1981 reform, Chile had a pay-as-you-go system, managed by the State in which workers enjoyed defined benefits. With the reform, the system became privately managed, with an individual capitalization logic based defined contributions to the system and uncertain benefits. The reform shifted the risk of the pension system to each individual. The table also illustrates the contrast with US system, which has a mixed retirement system, combining state and private management and a pay-as-you-go logic with capitalization.

The Chilean system is regulated by the government through the Superintendency of Pensions and includes some government guarantees for the most vulnerable populations with the Assistance Pension (PASIS) and the Minimum Guaranteed Pension (PMG). The PASIS amounts to around one-third of the minimum wage, and it was designed for those adults older than 65 years old whose family per capita income was below the minimum wage (Joubert & Todd, 2011). The PASIS did not require any contributions to the individual capitalization, and it targeted the most vulnerable families in terms of income. The PMG, by contrast, was designed to complement the pensions of those with low levels of contributions. Adults with more than 20 years of contributions were eligible to receive the PMG, which amounted to two-thirds of the minimum wage amount (Joubert & Todd, 2011).

HOW THE SYSTEM WORKS

Payroll workers are mandated to contribute 10% of their salary for the AFP system. Additional payments include 7% for health, 0.8% of disability and survivorship insurance, and a 2.6% average fee to the AFP (Joubert & Todd, 2011). Individuals can freely choose their AFP, which are in charge of investing those funds. Originally, AFPs could exclusively invest the funds in government bonds, but that requirement was relaxed over the years (Joubert & Todd, 2011). Before 2002, AFPs offered a single portfolio of investment but in 2002 the AFPs diversified their portfolios according to the risk level of the investment (Berstein et al., 2006). Five funds were created from A to E, where A represented the most risky investments and E involved the most conservative investments. AFPs charge a percentage fee of the workers' total contribution, regardless of the losses or gains in the individual accounts.

The access to pension funds is mostly restricted until retirement. Compared to 401(k) plans in the US, the access to AFP savings is more constrained (Joubert & Todd, 2011). If workers invest more than 10% of their wages in the system (voluntary savings pillar), they can retrieve those funds before retirement age. Women can access their pensions at age 60, while men are allowed to do so at age 65. There is a possibility of early retirement for individuals with sufficient funds in their accounts, but few individuals meet the requirements (Joubert & Todd, 2011).

When individuals reach the pension age, they can retrieve their funds in three different ways:

- **Programmed Withdrawals:** The AFP pays the old-age pension directly to the affiliate, charging the individual pension funds every year. The amount received decreases yearly, based on the amount in the individual account, the profitability of the funds and recalculations of the affiliate's life expectancy and their dependents. This is the most common retirement scheme.
- **Immediate Annuity Payments:** The pensioner purchases an annuity from an insurance company and the funds are no longer in the AFP. This option is only available for those who reach a certain level of savings in their accounts.
- **Temporary Deferred Annuity Payments:** This is a mix of the first two types described above. A programmed withdrawal can be changed to immediate annuity payments after a certain date defined by the pensioner.

THE 2008 REFORM

In 2008, Michelle Bachelet's administration passed one of the most important reforms in the pension system since its inception. One of the main objectives of the 2008 reform was to reduce the gender gaps in the system and to address old-age poverty (Joubert & Todd, 2011). The reform introduced a solidarity pillar to replace the old PASIS and the minimum pension guarantee (PMG, for its name in Spanish *Pensión Mínima Garantizada*). The old PASIS used to cover 20% of the most vulnerable old-age population, while the new Basic Solidarity Pension (PBS for its name in Spanish), was intended to cover 60% of the most vulnerable old-age population by 2011 that did not contribute to the AFP system (Encina, 2013). The old PASIS represented a monthly income of US\$75 whereas the PBS was expected to rise pension levels to US\$156 in July 2011 (Encina, 2013).

On the other hand, the Solidarity Pension Supplement (APS) replaced the PMG that was designed for those who had contributed for more than 20 years and received small pension amounts. The APS is intended to complement small pensions for those who are members of the AFP system, and its amount varies according to the pension amount received by the worker through the AFP system (Joubert & Todd, 2011).

The reform also included gender equality elements. One of the most important was recognizing women's role as mothers and providing a pension subsidy for each child. For each live birth, the state would deposit a one-time subsidy into the woman's individual account or increase the amount of her PBS. Another measure, usually favoring women, was the possibility of redistributing the individual capitalization account among married couples in the case of divorce, up to 50% of the total amount of the account. The reform also included a gender-neutral approach towards survivorship pension, giving men the right to receive a survivorship pension.

PRIMARY CHALLENGES

The system has been widely criticized for yielding low pension levels particularly in the case of low-income workers. When the system was devised, it was expected to generate replacement rates of around 75%, that is, workers were expected to receive 75% of their average earnings in active life in the form of an old age pension (Berstein et al., 2006). However, according to Berstein et al. (2006) only one-third of the members of the system achieve this. Using the OECD methodology to calculate replacement rates, the authors find that an average male earner would receive 58% of his last salary as a retirement income, while an average female earner would only receive 39% of their last salary.

The main differences in pension levels arise from the total amounts accumulated in the individual accounts. Final pension levels are highly determined by the quantity, timing, and number of the contributions (Berstein et al., 2006). The higher the amount of the contributions, the earlier the contributions are made, and the more consistent they are, the better the pension yield in the future. However, this assumes high salary levels, and regular and formal sector employment, which is not always the case when it comes to less skilled workers. Contribution densities are on average 54%, which is too low to guarantee a high pension level in the future (Berstein, Fuentes, & Torrealba, 2011). Education levels, age and gender explain most of the differences in contribution densities in the AFP system (Berstein et al., 2011).

This report focuses on gender disparities in the Chilean pension system. It discusses how gendered notions of labor and family work their way through labor market trajectories to create differences in contribution densities among men and women. It also explores how intergenerational characteristics have an effect on contribution densities to

the pension system. The following Chapter discusses the direct and indirect gender inequalities that put women's pensions in a disadvantaged position.

III. GENDER DISPARITIES IN THE PENSION SYSTEM

Following Orloff's (1993) categorization of welfare provision, the Chilean pension system can be characterized as a liberalist regime. In liberalist welfare regimes, most of the welfare provision is in the hands of the market, while minorities and disadvantaged groups have access to partial social assistance. This is the case in Chile, where the pension system relies heavily on the privatized AFP mandatory and voluntary pillars, while the state provides minimum pension amounts for the most vulnerable groups, where women tend to represent a large proportion of the recipients. This chapter explores the gender disparities found in the Chilean pension system, first examining factors directly related to the design of the system, and second, the indirect elements contributing to those inequalities.

FACTORS BEHIND GENDER DISPARITIES

The defined contribution pension system of individual capitalization was designed under the assumption of regular contributions in a stable and formal labor market. This pension configuration assumes that the average contributor is a male, dependent worker, employed in the formal sector of the economy – this is far from the actual conditions of the Chilean society and labor market (Ginn, Street, & Arber, 2001; Staab, 2012; United Nations, 2004). The reality is that women are in a more precarious situation in the labor market, mainly due to traditional gender norms, and therefore more frequently find themselves in a disadvantageous position in old age.

Several authors have touched on the problems that put women in a more vulnerable position in facing old age in Chile's individual capitalization pension system. Arenas de Mesa and Montecinos (1999) make a useful distinction between direct and

indirect inequalities faced by women in the pension system. The direct inequalities are those that stem from the rules of the pension system, such as the actuarial calculations used to determine pensions amounts, and retirement age. The indirect inequalities are those that influence women's contributions to the pension system, such as the socio-cultural role of women in the Chilean society and the adverse labor market conditions for women.

DIRECT INEQUALITIES

The direct inequalities are those related to the way the pension system is designed that disfavor women compared to men. Among the direct gender inequalities in the pension system is the use of gender-differentiated life expectancy tables to calculate the pensions amount received by system members (Arenas, Gana Cornejo, CELADE, & United Nations, 2001; Arenas de Mesa & Montecinos, 1999; United Nations, 2004). Women have on average, a longer life expectancy than men. As a consequence, using gender-differentiated life expectancy tables in the actuarial calculations of pensions yields lower pension payments to women even when they have the same amount of savings in their individual accounts. Table 2 illustrates the evolution of the gendered patterns of life expectancy in Chile, showing that women live on average 6 years longer than men in the generations born after 1965.

Table 2: Life Expectancy at Birth by Gender

	Men	Women	Difference
1950-1955	52.9	56.8	-3.9
1955-1960	53.8	58.7	-4.9
1960-1965	55.3	61.0	-5.7
1965-1970	57.6	63.8	-6.1
1970-1975	60.5	66.8	-6.3
1975-1980	63.9	70.6	-6.6
1980-1985	67.4	74.2	-6.8
1985-1990	69.6	75.9	-6.3
1990-1995	71.5	77.4	-5.9
1995-2000	72.8	78.8	-6.0
2000-2005	74.8	80.8	-6.0
2005-2010	75.3	81.4	-6.1
2010-2015	75.8	82.0	-6.2
2015-2020	76.3	82.6	-6.2

Source: Author's own elaboration using CELADE - Population division of ECLAC data, 2013 Revision

Women have to finance a longer period of retirement due to higher life expectancy. The use of differentiated life expectancy tables inevitably generates lower pension levels for women compared to men under otherwise equal conditions. Arenas et al. (2001) carried out a simulation in which they found that women had lower replacement rates than men, even when they had entered the labor market at the same age, had equal wages, had the same contribution density and retired at the same age, evidencing that at equal conditions, the pensions system produces less favorable results for women, *because* they are women.

Another direct inequality has to do with the establishment of differentiated retirement ages by gender. Women are allowed to retire 5 years earlier than men (60 and

65 years respectively). Therefore, they have a shorter time to accumulate funds in their individual accounts compared to men (Arenas de Mesa & Montecinos, 1999). Arenas et al. (2001) find that the difference in replacement rates between men and women when the former retire at 65 and the latter at 60 is 19 percentage points. This huge difference is explained by a shorter contribution period of women and gender-differentiated life expectancy tables, both direct gender inequalities of the pension system.

Moreover, the pension received is very sensitive to the timing of the contributions accumulated in the individual account. Financially, investing today is always better than investing tomorrow: the earlier the contributions are made, the longer they are invested and the more benefits they will accrue. Usually women contribute less at the early years of their active working life, because it coincides with pregnancy and child rearing times, which undermines their future pension. The one-time subsidy introduced in the 2008 reform for each birth or adoption, attempts to palliate this situation and equalize pensions among men and women.

INDIRECT INEQUALITIES

The indirect inequalities will be analytically differentiated among those related to socio-cultural factors affecting women – these include the notion of women as caregivers and their role in the gender division of labor – and the labor market conditions regarding women’s employment. Certainly both factors are intertwined, as sociocultural factors affect women’s labor force participation and labor market conditions towards women, and vice-versa.

Socio-Cultural Factors and a Life Course Perspective

Chile is a socially conservative country that has reproduced traditional gender norms in which women have conventionally been in charge of the household, undertaking unpaid domestic work and assuming a caregiver role, while men have served as the breadwinners (Staab, 2012; United Nations, 2004). Social policy –in general– has been articulated following this pattern, providing access to social benefits to women in their roles as mothers or wives (Staab, 2012). Women, when performing unpaid domestic work, are usually ignored as recipients of welfare, which is especially paradoxical given their unrecognized role as welfare providers (Orloff, 1993).

The pension system, under its privatized scheme, disfavors women as a consequence of their participation and trajectories in the labor market. As caregivers, an important proportion of women do not participate in the formal labor market, and they also interrupt their careers more often than men to take care of others (Cox Edwards, 2002). This generates irregular contribution patterns, undermining women’s future pension benefits. State assistance, however, under the 2008 reform, favors women in the role of mothers with the one-time subsidy for birth or adoption.

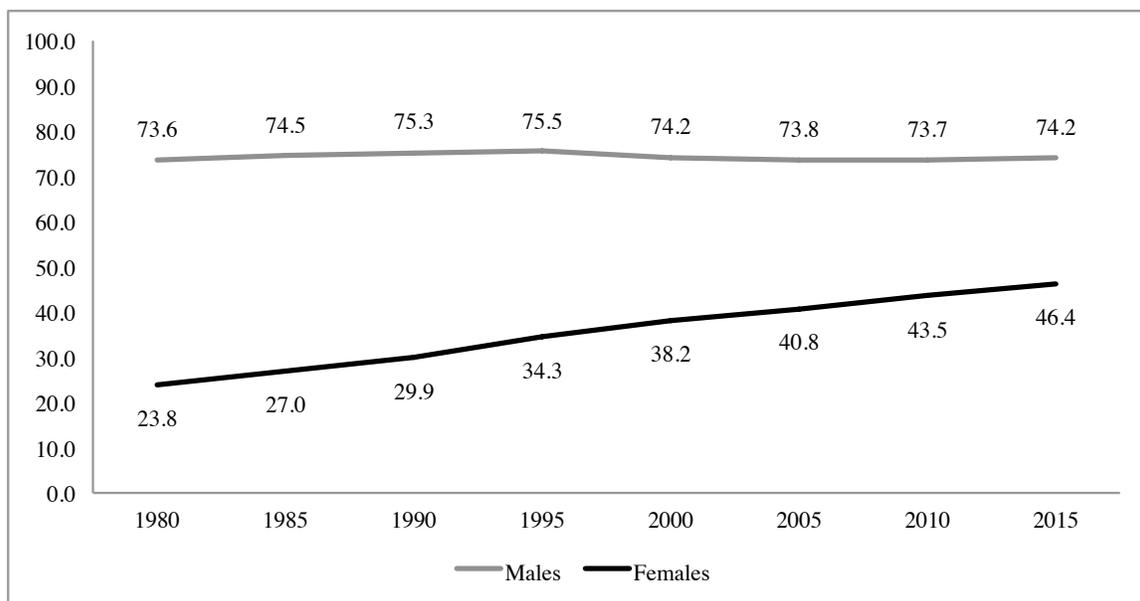
Labor Market Conditions for Women

A pension system that profoundly relies on formal sector labor participation disfavors women with respect to men. The gender division of labor has had a negative impact on women’s paid work outside the household, limiting their participation in the labor market. Moreover, the labor market opportunities are more limited for women, as their participation is seen as a “second income” by the employers (INE, 2014). Since participation in the contributory pension system is highly dependent on the labor market, women with unstable employment trajectories will have irregular contribution patterns to

the pension system and, therefore, lower pension levels. The same is true for labor conditions, particularly with respect to wages; lower wages for women imply lower pension levels in the future.

Chile is among the Latin American countries with the lowest female labor force participation, not exceeding 50% of women (Martínez Gómez, Miller, & Saad, 2013). Figure 1 depicts the evolution of women’s and men’s participation in the labor market in Chile. While men’s participation rate has maintained relatively stable since 1980, women’s participation has increased almost 22 percentage points. However, the levels of women’s participation have always been significantly lower than those of men. In 1980, around the same time the pension system was reformed, only 24% of the women participated in the labor market, compared to 74% of the men. In 2015, the share of working women has reached 46% while men’s participation is still much higher (74%).

Figure 1: Share of economically active population by Gender (1980 – 2015)



Source: Author’s own elaboration using CELADE - Population division of ECLAC data, 2013 Revision

Furthermore, women who work, tend to have more discontinuous labor trajectories, ones that can be associated with their assumed social function as caregivers (United Nations, 2004), and with their more unstable employment opportunities in the labor market (Selamé, 2004). Table 3 shows the proportion of working women in each age group. The peak of women's participation in the labor market occurs between the ages of 25-29. In general, after that, the numbers tend to decrease, coinciding with the timing of childrearing and other responsibilities that women assume in the household. Nevertheless, it is important to note the evolution in terms of participation levels. While in 1980 the share of women's participation in the labor market among those between 20 - 39 years in 1980 was at 30%, the number reached 60% in 2015.

Table 3: Share of Economically Active Women by Age Groups

	1980	2010	2015
15 - 19	14.0	17.4	19.4
20 - 24	33.0	49.8	53.1
25 - 29	34.8	61.2	64.4
30 - 34	32.3	58.8	62.6
35 - 39	30.6	57.7	61.6
40 - 44	28.6	58.4	62.1
45 - 49	25.8	56.5	60.2
50 - 54	21.5	50.5	54.3
55 - 59	16.2	41.7	45.6
60 - 64	10.1	28.2	31.9
65 - 69	6.9	18.5	21.5
70 - 74	4.4	10.6	12.6

Source: Author's own elaboration using CELADE - Population division of ECLAC data, 2013 Revision

The proportion of working women also varies significantly by educational achievement (Table 4). The proportion of working women is considerably lower than the proportion of working men, particularly at lower levels of education and among the poorest households (Jeri, 2008). This implies that, overall, a smaller proportion of women contribute to the pension system compared to men, and this depends on educational levels and household income. Table 4 reveals that women’s participation in the labor market is higher for the most educated women compared to the least educated women, driving inequalities in pension contributions among women.

Table 4: Labor Market Participation Rate by Years of Education and Gender

Years of Education	Men	Women	Difference
0 to 3	52	16	36
4 to 6	65	19	46
7 to 9	70	27	43
10 to 12	72	38	34
13 to 16	74	56	18
17 and more	85	75	10

Source: Jeri (2008) using 2002 Census data.

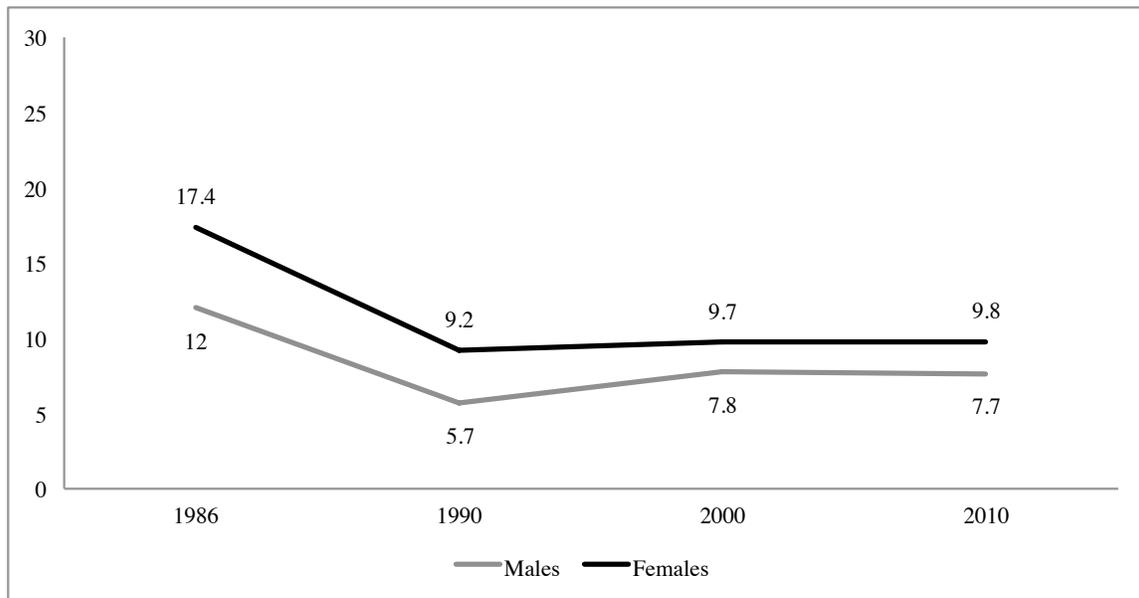
Labor market problems affecting women such as labor segregation, lower wage levels, and informality, also contribute to create disparities between women’s and men’s contributions to the pension system. On the one hand, there is a horizontal labor segregation, where women are disproportionally concentrated in specific economic sectors, such as health and, education, or in occupations associated with feminine tasks such as domestic work (INE, 2014; Selamé, 2004). On the other hand, vertical labor

segregation speaks to the small number of women in supervisory positions and their concentration in more precarious job positions, with more disadvantageous working conditions and greater instability. For example, most CEO and company board member positions tend to be male dominated. Thus, female employment does not necessarily yield better pensions for women than for men since wage differentials and instability undermines women's capitalization in the pension system.

Women also face greater challenges than men do in seeking employment. Women tend to be unemployed for longer periods than men (Selamé, 2004) and their unemployment level is usually higher. Figure 2 depicts the trend in unemployment rates¹ by gender between 1986 and 2010. Figure 2 reveals that women face higher unemployment rates than men, evidencing that women have more difficulties in the labor market. The differences in unemployment rates between men and women, however, have been decreasing over time.

¹ Unemployment is the quotient between the total unemployed and the total workforce. The total unemployed and the total workforce both include those subjects that are not looking for a job because they are to start one in the short-term.

Figure 2: Unemployment Rate in Chile by Gender (1986-2010)



Source: Encuesta Nacional de Empleo INE – December to February Trimester in INE (2014)

One of the most important labor market gender disparities -that directly translates on the contributory pensions system- is wage inequality. On average, employed women enjoy a slightly higher level of educational achievement, but their average wage level is lower for comparable employment (Selamé, 2004). When comparing men and women in the same occupations, educational levels or age levels, men receive greater compensation than women (INE, 2014). The National Statistics Institute using data from the 2013 Income Survey, reveals that the average wage of men is 32.3% higher than that of women (INE, 2014). The wage gap ranges from 19% in office employments to 65.9% for mechanical workers, always favoring men. The same study shows that employment informality also generates gendered wage patterns. When defining informality as the lack of formal contract, women are still paid 12% less than men.

This chapter summarized the main sources of gender inequality in the pension system, both direct and indirect. On the one hand, design aspects of the pension system

such as the use of gender-differentiated life expectancy tables and retirement ages are the main drivers of direct inequalities. On the other hand, indirect inequalities are related to gender norms of work and family, and labor market trajectories and conditions. This report focuses on the indirect gender inequalities and how they influence contribution densities, and important aspect of the pension system. This report seeks to address the following questions:

- Do traditional social norms about the role of women in the sexual division of labor have an effect on contribution densities?
- Are there gender differences in labor market trajectories? Do these gender differences have an influence on contribution densities in the Chilean pension system?

Additionally, as an exploratory fashion, this report examines the relationship of household of origin characteristics and contribution densities from a gender perspective:

- Is there a gendered intergenerational transmission of social disadvantage, expressed in contribution densities to the pension system?

The next chapter of this report explains the datasets used for the analysis and presents some descriptive statistics about labor trajectories of men and women.

IV. DATA AND DESCRIPTIVE STATISTICS

The present study uses administrative data, stripped of individual identifiers, from the Superintendencia de Pensiones and longitudinal survey data from the Encuesta de Protección Social of the Universidad de Chile Centro de Microdatos (CMD), provided by the Presidential Advisory Commission on Pensions. The Social Protection Survey is a longitudinal survey conducted in Chile in the years 2002, 2004, 2006 and 2009,² under the commission of the Undersecretary of Social Security of the Minister of Labor. The CMD, the University of Pennsylvania and the University of Michigan and the Undersecretary of Social Security collaborated in the design of the survey and the data collection process. The survey gathers information on the labor market trajectories, social security, health and education history and other socio-demographic information of the individuals and their households.

Table 5 describes each wave. The 2002 wave was comprised of a representative sample of members of the social security system (both the individual capitalization and the old pay-as-you-go scheme). It is therefore only representative of social security members and not of the entire adult population. The 2004 wave surveyed the same individuals in the 2002 wave, updated the sample of social security system members, and included a new representative sample of non-members of the system, covering a nationally representative sample.

² A 2012 version was conducted but its results have not yet been released.

Table 5: EPS Waves and Sample

Wave	Sample	Representativeness	N (excluding the deceased)
2002	Social Security System Members (individual capitalization and pay- as-you-go)	Social Security System Members between 1981-2001, 15 years old and older.	16,309
2004	Updated sample of Social Security members and representative sample of non-member of the Social Security System	National (excluding Armed Forces), 18 years old and older	16,727
2006	Same individuals in 2002 and 2004	-	16,443
2009	Same individuals in 2002 and 2004	-	14,463

Source: Author's own elaboration using Centro de Microdatos (n.d.) information

For the analysis, the sample is restricted to those between 18 and 60 years old in any of the waves, as a measure of active life, and to those who are members of the AFP system. Since there was attrition through the waves, the latest available information for an individual is used. Where no information was available in the 2009 wave, the 2006 information was used, going all the way back to 2002, to be able to preserve the maximum number of cases for the analysis. The idea was to maximize the total number of cases for the analysis, and using only the latest available weights (2009) would have greatly diminished the number of observations. For the same reason, sampling weights provided by EPS were not used in the analysis. Weights are provided by each wave, but the relationship between the 2009 or the 2006 weights is unclear, so conceptually it was better not to use them than mixing them together.

This report takes advantage of the longitudinal nature of the EPS by using the aggregated information on the labor history of each individual. The EPS survey asks each individual about his or her monthly labor history from 1980 to the latest wave (2009). Complete information, however, is not available for all the respondents. Table 6 shows the data divided into selected percentiles, and the minimum and maximum amount of reported months of labor history. For example, P10 indicates that the lowest 10% of respondents in the distribution reached 143 months or less of reported labor history; P25 indicates that the lowest 25% in the distribution of reported months of labor history had up to 232 months. Around 25% of the respondents have information for the total period of time, and most of the sample is concentrated on the higher end of the month distribution, having information for most of the registered time. Only 10% of the sample has information for less than 143 months, which is still around 12 years of labor history.

Table 6: Total Number of Labor History Months
Reported in EPS Panel

Minimum	1
Maximum	352
P10	143
P25	232
P50	323
P75	352
P90	352

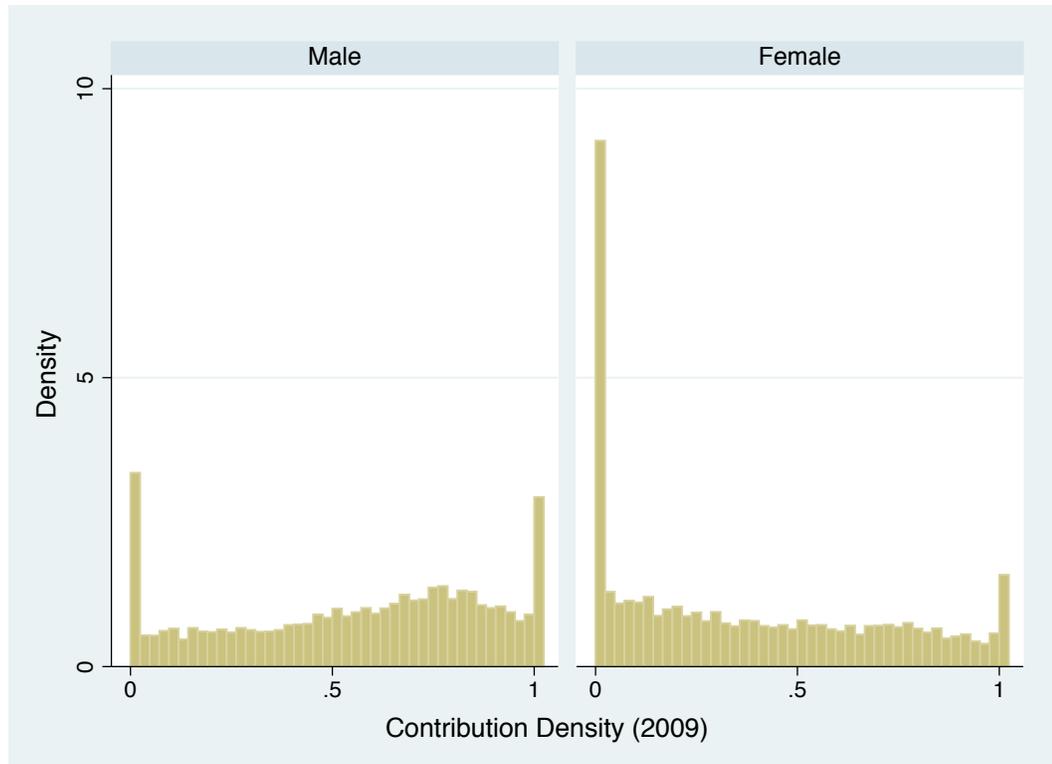
Source: Author's own elaboration based on EPS data provided by the Presidential Advisory Commission on Pensions

The variable of interest in this report is “density of contributions,” a measure that takes advantage of the longitudinal nature of the EPS dataset. The density of

contributions is measured as the number of times a person contributed monthly to a pension account (either in the old pay-as-you-go system or in the AFP system) over the total number of months of labor history recorded in the EPS. Contribution densities are an indicator of the level of savings in the individual account for old age. I use the total density of contributions (which includes contributions to the old pension system) and not exclusively AFP contributions because the scope of this report does not allow me to create labor histories separated by the time each individual went from being a non-AFP member to an AFP member. Using the labor history from the moment in which each contributor becomes an AFP member would be a more accurate measure to understand AFP contribution. However, the underlying assumption in this report is that the propensity to contribute to the pay-as-you-go system is the same as the propensity to contribute to the AFP system.

Figure 3 depicts the differences in contribution densities among men and women between 18 and 60 years old who are members of the AFP system. Both men and women have a concentration of values in 0% of contributions and 100%. As expected, the number of women with 0% contribution is larger than the number of men with zero contributions, and the number of men with 100% of contributions is larger than the number of women with complete contributions. The distribution for men is skewed towards higher contribution densities, while that of women is more concentrated around lower levels of contributions densities, evidencing gender disparities in savings for old age.

Figure 3: Contribution Densities of AFP members between 18 and 60 years old by Gender



Source: Author's own elaboration based on EPS data provided by the Presidential Advisory Commission on Pensions

Table 7 describes the key characteristics of the EPS sample and the variables used in the analysis. The information on age in 2009 is taken from the administrative dataset. Men and women are almost equally represented in the sample, and both have an average age of 46 years, and around 10.5 years of education on average. As seen in the histograms above, however, their contribution densities differ notably; men have contributed on average for 56% of the study period while women only boast a 36% contribution, even though the number of months recorded in the EPS labor history is similar (on average, men only have 3 more months recorded than women). In terms of marital status, both men and women are predominately married or with a partner, but the proportion of married men in the sample is notably higher than the proportion of married

women (67% vs. 57%). Women are divorced or separated in a higher proportion than men (13% vs. 7%). The same is true for widows over widowers (5% vs. 1%), reflecting the greater life expectancy of women. The proportion of single men and women is virtually the same.

Table 7: Descriptive Statistics for AFP members between 18 and 60

	Male		Female	
	Mean	N	Mean	N
Gender	50.37	8,320	49.63	8,197
Age 2009	45.89	8,292	45.70	8,174
Years of Education	10.39	8,245	10.59	8,150
Contribution Density	0.56	8,292	0.37	8174
Months of Labor History in EPS	269.98	8,292	273	8174
Marital Status				
Married/Partnered	67.09	5,582	56.79	4,655
Divorced/Separated	7.19	598	13.24	1,085
Widowed	1.19	99	4.67	383
Single	24.53	2,041	25.3	2,074
Mother's Education				
None	12.56	1,045	12.58	1,031
Basic Incomplete	41.37	3,442	44.57	3,653
Basic	6.39	532	6.65	545
High School Incomplete	8.58	714	9.13	748
High School and More	15.02	1,250	15.76	1,292
No Response	16.07	1,337	11.32	928
Mother worked outside of the home as a child				
	0.46	8,083	0.48	8,007
SES Family of Origin				
		8,315		8,183
Extremely Poor	3.51	292	3.35	274
Poor	41.62	3,461	35.11	2,873
Good	52.76	4,387	58.34	4,774
Very Good	2.1	175	3.2	262

Source: Author's own elaboration based on EPS data provided by the Presidential Advisory Commission on Pensions

Table 7 also provides information on the family of origin of the interviewees. The distribution of mother's education is similar across genders, with a concentration at lower educational levels. The Chilean school system is divided between basic education (grades 1-8) and high school (grades 9-12). Most of the interviewees report that their mothers had completed less than 8 years of formal education. It is interesting to note that the interviewees' average education is 2 years higher than their mothers. Additionally, when growing up, both men and women shared a similar proportion of working mothers (46% and 48% respectively). Finally, when assessing the socioeconomic conditions of their family of origin, both men and women identified them mainly as good, followed by poor. A minimal amount of households were classified in the extremes, either very good or extremely poor.

The EPS monthly labor history was used to create the information presented in Table 8, below. Table 8 shows gender differences in the number of months, men and women between 18 and 60 years old, spent on average in different employment settings. In general, men spent more months in all the working categories reported in Table 8, with the exceptions of being a public employee and working unpaid with a family member, a setting in which women spent greater amount of time. As expected, most of the differences are statistically significant. In terms of type of employment, the greatest differences between men and women are reported in holding permanent jobs: men held a permanent job for 197 months on average, compared to 147 months for women, which is around 4 years. With respect to occupational sector, men were employed significantly longer than women in the private sector (70 months of difference, that is 6 years). In terms of the contractual relationship, for both men and women having a contract is more widespread, but again men had contracts for more months than women on average (170 vs. 125 months). For union participation, men have a higher level of participation than

women on average. The norm, however, is not participating in unions or professional associations for both genders: the months spent unionized are fewer than the months spent non-unionized.

The last part of the table shows the reasons for not working during those months. This reveals gendered social norms with respect to family life and working. First, women spent a greater time not working than men, regardless of the reason. The most striking differences between genders were in the categories of not working due to household work – women did not work 85 months more than men on average for to this reason – taking care of children (53 months of difference), and other personal or family responsibilities (31 months). Overall, Table 8 firmly supports the notion of Chile as socially conservative, reproducing a traditional gender division of labor, with men as the primary worker of the household, and women as a source of additional income with primary duties as caregivers.

Table 8: Gender Differences: Number of Months self-reported in EPS

	Men	Women	Difference	t
Months in Type of Employment				
Permanent	197.37	146.54	50.83	28.82
Seasonal	61.04	38.6	22.43	13.76
Occasional	35.02	23.6	11.41	6.99
Probationary	61.66	49.26	12.39	3.84
Fixed Term	21.62	20.56	1.06	0.36
Months in Type of Occupation				
Employer	64.96	45.03	19.92	5.85
Independent	116	82.63	33.36	11.3
Public employee	98.92	110.02	-11.1	-3.41
Private Employee	174.36	103.65	70.7	43.032
Live-In Domestic Worker	132.87	74.78	58.08	4.52
Live-Out Domestic Worker	45.66	85.76	-40.09	-3.06
Working with a Family Member				
Unpaid	50.6	53.54	-2.93	-0.389
Armed Forces	114.59	69.66	44.93	2.44
Contract				
Formal Contract	170.45	125.38	45.07	25.85
No Contract	55.11	48.2	6.91	4.06
Mean work hours - weekly	48.97	45.54	3.42	20.07
Union Participation				
Yes	100.73	86.3	14.42	4.93
No	205.31	139.15	66.16	39.39
Months not working due to				
Illness or Disability	72.49	74.24	-1.75	-0.33
Taking care of children	34	87.27	-53.27	-37.65
Other personal or family responsibilities	36.85	68	-31.15	-7.59
Studying or Training	54.4	57.8	-3.39	-3.72
Internship	11.37	11.75	-0.38	-0.18
Household Work	41.15	126.58	-85.42	-9.19
Retired	55.63	51.57	4.06	13.24
Not interested	29.07	51.27	-22.19	-6.99
Military Training	19.8	32.75	-12.94	-0.88
Other	28.02	38.92	-10.89	-3.64
Took care of the elderly	19	24.17	-5.17	-0.67

Source: Author's own elaboration based on EPS data provided by the Presidential Advisory Commission on Pensions

This Chapter has performed descriptive analysis of longitudinal survey data to the differences between men and women in terms of contribution densities to retirement pensions. The evidence is suggestive of the role gender norms of family and work in Chile play in these disparities. The following Chapter uses this data to perform regression analysis to predict these differences.

V. MODELING AND RESULTS

The outcome variable in this report, contribution density, is estimated using a double-corner solution tobit model. Contribution densities for men and for women have an important agglomeration in 0 contribution densities (no contributions) and 1 (100% of the contributions during the entire period under study). The model predicts the contribution density at the individual level, using labor market and socio-economic information from the individual, and household of origin characteristics.

LABOR MARKET TRAJECTORIES AND TRADITIONAL NOTIONS OF GENDER NORMS

Table 9 (in Appendix) reports the results of four tobit models to predict contribution densities. The first two models predict contribution densities using labor market variables for men and women separately, controlling for age, education, and marital status. Models with marital status have a better fit than labor models without it, so this control was included in all the models. Models 3 and 4 add the number of months not working due to different reasons to explore gendered notions towards work and family, and are also estimated separately for men and women. Likelihood ratio tests between nested Models 1 and 3 (for men), and nested Models 2 and 4 (for women), reveal that the estimations including labor market characteristics and reasons for not working produce a better fitted model. AICs and BICs reported in Table 9 also provide support for including these variables.

Socio-demographic characteristics have a significant influence on contribution densities. An increase in education years predicts a higher contribution density. This is probably due to the type of jobs better-educated people have access to. A woman with 12 years of education, married, 46 years old, who grew up in a poor household and with a

mother with less than 8 years of formal education, has a predicted contribution density of 36%. A woman with the same characteristics but with 16 years of education has a predicted density of 52%, while a woman with 8 years of education and the same conditions only reaches 21% of contribution densities. This reveals that education has a significant effect on women's contribution densities.

Marital status also has significant effects on contribution densities: decreases contribution densities for single men, while it increases contribution densities for single women (Models 3 and 4 in Table 9). For divorced or separated men, it reduces contribution densities but it does not have a significant effect for divorced women. When comparing women under the same conditions (46 years old, 12 years of education, who grew up in a poor household and with a mother with less than 8 years of formal education) being single predicts higher contribution densities than being married: 51% vs. 36%.

Overall the results from the EPS survey demonstrate that labor market trajectories highly influence contributions to the pension system (Table 9). An increase in the mean hours of weekly work and the months in any kind of employment (working in a probationary status, permanent, seasonal, occasional or fixed-term jobs) increase the predicted contribution density, particularly for women. It is interesting to note that the effects of being in a permanent, probationary status, and seasonal job are positive and significant for men in Model 1 but become insignificant in Model 3 when controlling for the months of unemployment. For women, all the effects of type of employment remain significant from model 2 to model 4, but the significance levels change; at a 95% confidence level, only being in a permanent job or working in a probationary status has an effect on the contribution density.

In terms of contractual relation, an increase in the number of months having a formal contract increases significantly the contribution densities for men, but it does not have an effect for women. However, it is interesting to note that the number of months not having a contract predicts a positive and similar contribution density for men and women. Not having a contract is a sign of labor informality, and it is rather surprising that it predicts positive contribution densities and that the gender differences are rather small.

On the other hand, an increase in the number of months not working due to different reasons decreases contribution densities in general. The number of months not working due to taking care of children or the elderly significantly reduces women's contribution densities, supporting the idea that traditional gender norms affect women's labor market trajectories, impacting later on the contributory pension system.

A puzzling result, however, is that, holding everything else constant, the number of months in any type of occupation (employer, independent, public, private, domestic service, or unpaid with a family member), decreases the predicted contribution density. These results do not differ by gender. Finally, union participation or non-participation does not have a significant effect on contribution density.

INTERGENERATIONAL TRANSMISSION OF SOCIAL DISADVANTAGE

The estimated tobit models in Table 10 explore the relationship between household of origin characteristics – measured by the question “how would you characterize the economic conditions of the household where you grew up?” – mother's education, and if the mother worked outside the household when the interviewee was a child, with pension contribution. Most of the control variables reveal the same relationship described in the previous section, with the exception of women who are

divorced or separated, for whom there is a significant and positive effect on contribution densities in model 6 in Table 10.

The better the socioeconomic status of the family of origin, the higher the predicted contribution density for men. However, this relationship does not hold when comparing the extremely poor households with the better off (very good conditions), probably due to the small number of cases in those categories. The only significant relationship for women appears when comparing those who grew up in a well-to-do household with those who grew up in extreme poverty, and the relationship holds at a significance level of 10%. This suggests a gendered pattern in which socioeconomic conditions of the household of origin affects future life outcomes such as contributory pensions: socioeconomic conditions of the household of origin mainly affects men's outcomes on the pension system.

Contrary to the effect on contribution density of socioeconomic conditions of the household of origin, whether the mother worked outside the household when the interviewee was a child has a significant positive effect on contribution densities only for women. This is consistent with previous research that has found a relationship between having had a working mother and participation in the labor market for women (Contreras & Plaza, 2010). This result suggests that having a working mother can have a positive impact on the contributory pension system for the next generation of women by increasing their labor participation.

When examining the case of mother's education, having a mother with a higher educational attainment, predicts an increase in contribution densities for both men and women. The clear increase in contribution densities for men and women holds until mother's education reaches high school incomplete. Surprisingly, having a mother with at

least a high school education compared to having an uneducated mother does not significantly increase the pensions contribution density for men.

Table 10: Tobit Coefficients on EPS Contribution Densities by Gender

VARIABLES	(5) Male	(6) Female
Years of Education	0.0190*** (0.00117)	0.0373*** (0.00132)
Age -2009	0.0140*** (0.00278)	0.0113*** (0.00309)
Age Squared - 2009	-0.000132*** (-0.0000295)	-5.50e-05* (-0.0000333)
Marital Status (Married/Partner as reference)		
Divorced/Separated	-0.0749*** (0.0149)	0.0517*** (0.0128)
Widowed	-0.0272 (0.0361)	-0.00345 (0.0216)
Single	-0.166*** (0.00983)	0.146*** (0.0104)
SES Family of Origin (Extremely Poor as Reference)		
Poor	0.0503** (0.0215)	0.0179 (0.0246)
Good	0.0716*** (0.0218)	0.0429* (0.0246)
Very Good	0.00792 (0.0341)	-0.0501 (0.0340)
Mother Worked	0.00328 (0.00785)	0.0254*** (0.00855)

Table 10: Tobit Coefficients on EPS Contribution Densities by Gender (*Continued from page 35*)

Mother's Education (None as Reference)		
Basic Incomplete	0.0600*** (0.0127)	0.0531*** (0.0142)
Basic	0.0668*** (0.0193)	0.0538** (0.0214)
High School Incomplete	0.0749*** (0.0181)	0.0547*** (0.0197)
High School and More	-0.00281 (0.0167)	0.0335* (0.0181)
No Response	0.0532*** (0.0148)	0.0188 (0.0181)
Constant	-0.0390 (0.0693)	-0.581*** (0.0752)
Sigma	0.335*** (0.00295)	0.364*** (0.00343)
Observations	7,987	7,941
Log-likelihood	-3515.59	-4252.6
AIC	7065.18	8539.20
BIC	7183.93	8657.86

*** p<0.01, ** p<0.05, * p<0.1, SE in parenthesis

VI. DISCUSSION

The analysis conducted in the previous section has several limitations. First, the analysis of inequalities in the AFP pension system is analyzed only through contribution densities. Contribution densities are an indicator of pension savings that do not necessarily reflect future pension amounts. Analyzing contribution densities capture the frequency of payments to the system, but it overlooks the amounts and the timing of the contributions. Men and women with the same contribution density can have different amounts of total savings given wage gaps in the labor market and the timing of those contributions. A woman with 75% of contribution density and earning the minimum wage will have different retirement savings than a man with the same density, but earning three times the minimum wage. Thus, contribution density is an important but limited indicator of gender inequalities in the Chilean pension system.

Second, this reports only focuses on AFP members. Those who are not incorporated into an AFP (probably due to the lack of any type of formal job) are not part of the analysis. This is particularly troublesome given that those who are not members of the system due to labor market exclusion³ are probably part of the most vulnerable population in old age. Not including them likely underestimates gender differences in the pension system.

Finally, the analysis presented in this report used the latest available information in the EPS waves, instead of allowing time-varying characteristics. Allowing time variation by wave in contribution densities and labor histories would make it possible to capture more accurate and detailed results, and to control for individual and time-

³ Armed Forces have their own pension system and therefore, are not members of the AFP system.

invariant characteristics to disentangle the effects of the predictors (especially the dynamics of contribution behavior).

The results presented in this report nevertheless confirm the existence of indirect gender inequalities that originate in the labor market and are then transmitted to the pension system. Furthermore, the results clearly support the existence of traditional gender norms with respect to work and family, which ultimately also have an effect on the pension system through labor market trajectories. Men and women have significantly different labor market trajectories; they differ in the number of months in a type of employment, occupation, contractual relationship, and mean hours of work, among other characteristics. These different trajectories also have a differential impact on the pension system by gender. The number of months in a type of occupation has an effect on women's contribution density but not on men's, and the number of weekly working hours has a larger effect for men than for women. Moreover there are clear gendered patterns for not working, women on average spend more time unemployed than men and the number of months not working due to taking care of children or the elderly only has a negative effect on women's contribution densities.

Furthermore, an interesting contribution of this report is the exploratory analysis of intergenerational transmission of social disadvantage. The results reveal that higher mother's education levels predict higher contribution densities, suggesting that the relationship actually goes in the direction of transmitting advantages. The same is true for the socio-economic conditions of the household of origin for men. The better off the household, the higher the contribution densities. None of these predicted contribution densities are negative, even when exploring different reference categories.

An interesting question for future research is whether the AFP system is simply reproducing the gender differences found in the labor market or is it making the gender

gaps larger, particularly after the 2008 reform that introduced some gender equity objectives.

Addressing the direct inequalities of the contributory pension system is more straightforward than reforming the system with a focus on the indirect inequalities. Most researchers agree that eliminating gender-differentiated life expectancy tables for the actuarial calculations of the system and equalizing retirement ages would contribute to reducing pension gaps between men and women, addressing design issues in the pension system (Arenas et al., 2001; United Nations, 2004). Nonetheless, in the case of indirect inequalities, reforms are not as simple since they involve labor market structures and gendered social norms that are deeply embedded in the Chilean society.

In the future, reforms need to recognize the gendered patterns of work and family life. The 2008 reform, which included a one-time payment in the retirement account for each women's birth or adoption, goes in that direction but it is not enough. Pregnancy is not the only reason why women interrupt their pension contributions. Childrearing and taking care of the elderly significantly disrupts labor market participation for women, impacting negatively on their pensions. Thus, reforms to the pension system need to address the role of women as unpaid welfare providers understood as wider phenomenon, not exclusively focusing on pregnancy.

VII. APPENDIX

Table 9: Tobit Coefficients on EPS Contribution Densities by Gender

VARIABLES	(1) Male	(2) Female	(3) Male	(4) Female
Years of Education	0.00664*** (0.000803)	0.00873*** (0.000859)	0.00836*** (0.000861)	0.00695*** (0.000913)
Age -2009	-0.0181*** (0.00244)	-0.0295*** (0.00203)	0.00508* (0.00269)	-0.00664*** (0.00236)
Age Squared - 2009	0.000141*** (-0.0000245)	0.000255*** (-0.0000216)	-0.0000589** (-0.0000264)	0.0000589** (-0.0000241)
Marital Status (Married/Partner as reference)				
Divorced/Separated	-0.0338*** (0.0107)	-0.00504 (0.00798)	-0.0357*** (0.0105)	-0.0104 (0.00783)
Widowed	-0.0195 (0.0258)	-0.00553 (0.0139)	-0.0171 (0.0253)	-0.0121 (0.0137)
Single	-0.0749*** (0.00723)	0.0414*** (0.00658)	-0.0746*** (0.00710)	0.0289*** (0.00655)
Contract				
Formal Contract	0.000802*** (0.000193)	0.000365* (0.000186)	0.000768*** (0.000189)	0.000294 (0.000183)
No Contract	0.00282*** (0.000182)	0.00280*** (0.000174)	0.00278*** (0.000178)	0.00270*** (0.000170)
Mean hours of work - weekly				
	0.00113*** (0.000305)	0.000942*** (0.000249)	0.000830*** (0.000300)	0.000677*** (0.000245)

Months of Union Participation

Participation	0.000499 (0.000467)	0.000448 (0.000757)	0.000487 (0.000453)	0.000375 (0.000741)
No Participation	0.000297 (0.000465)	0.000273 (0.000753)	0.000273 (0.000452)	0.000195 (0.000737)

Months in Type of Employment

Trial	0.00148*** (0.000510)	0.00266*** (0.000894)	0.000558 (0.000498)	0.00190** (0.000875)
Permanent	0.00158*** (0.000504)	0.00271*** (0.000886)	0.000722 (0.000492)	0.00196** (0.000867)
Seasonal	0.00122** (0.000507)	0.00231*** (0.000889)	0.000316 (0.000495)	0.00150* (0.000870)
Occasional	0.00131** (0.000514)	0.00240*** (0.000899)	0.000386 (0.000503)	0.00158* (0.000880)
Fixed	0.000769 (0.000645)	0.00244** (0.000950)	-0.000124 (0.000631)	0.00162* (0.000930)

Months in Type of Occupation

Employer	-0.00126*** (0.000200)	-0.00155*** (0.000481)	-0.00127*** (0.000197)	-0.00147*** (0.000470)
Independent	-0.00243*** (0.000191)	-0.00261*** (0.000468)	-0.00243*** (0.000188)	-0.00253*** (0.000457)
Public Employee	-0.00295*** (0.000267)	-0.00306*** (0.000498)	-0.00293*** (0.000262)	-0.00292*** (0.000487)
Private Employee	-0.00291*** (0.000262)	-0.00298*** (0.000496)	-0.00290*** (0.000257)	-0.00285*** (0.000485)
Live-In Domestic Worker	-0.00290*** (0.000320)	-0.00302*** (0.000504)	-0.00291*** (0.000314)	-0.00289*** (0.000492)
Live-Out Domestic Worker	-0.00254*** (0.000595)	-0.00310*** (0.000495)	-0.00237*** (0.000583)	-0.00296*** (0.000484)

Working with a Family Member Unpaid	-0.00317***	-0.00327***	-0.00316***	-0.00309***
	(0.000383)	(0.000548)	(0.000376)	(0.000535)
Months not working due to				
Illness or Disability			-0.00183***	-0.00104***
			(0.000145)	(0.000132)
Taking care of children			-0.000957	-0.00101***
			(0.00142)	(-0.0000703)
Other personal or family responsibilities			-0.00175***	-0.000913***
			(0.000291)	(0.000105)
Studying or Training			-0.00156***	-0.000553***
			(0.000111)	(-0.0000955)
Internship			-0.00170	-0.000176
			(0.00120)	(0.000918)
Household Work			-0.00285**	-0.000966***
			(0.00112)	(-0.0000593)
Retired			-0.00161***	-0.000028
			(0.000190)	(0.000224)
Not interested			-0.00204***	-0.000990***
			(0.000245)	(0.000139)
Military Training			-0.000564	-0.000639
			(0.000436)	(0.000833)
Other			-0.00170***	-0.00107***
			(0.000227)	(0.000172)
Took care of the elderly			0.00122	-0.00302***
			(0.00628)	(0.00112)
Does not know			-0.00188*	-0.00184***
			(0.00112)	(0.000483)
Constant	0.743***	0.721***	0.389***	0.359***
	(0.0548)	(0.0478)	(0.0568)	(0.0510)
Sigma	0.241***	0.221***	0.236***	0.216***

	(0.00208)	(0.00202)	(0.00203)	(0.00197)
Observations	8,112	7,269	8,112	7,269
Log-likelihood	-1047.8548	-379.80209	-860.45997	-209.931
AIC	2145.71	809.6042	1794.92	493.862
BIC	2320.737	981.8885	2053.961	748.8428

*** p<0.01, ** p<0.05, * p<0.1, SE in parenthesis

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